

DRAFT 6/10/05

* USE IN CONJUNCTION WITH STORED SPECIFICATION 1007REFS *

(608PANEL, xx/xx/xx)

SECTION 608 - SIGN PANELS:

608-1 Description: of the Standard Specifications is revised to read:

The work under this section shall consist of furnishing and installing sign panels in accordance with the details shown on the plans and the requirements set forth herein.

The sign panels shall be of the following types:

- Extruded Aluminum Sign Panels With Demountable Characters
- Flat Sheet Aluminum Sign Panels With Direct-Applied or Silk-Screened Characters
- Warning, Marker, and Regulatory Sign Panels
- Route Shields for Installation on Sign Panels
- EXIT ONLY for Installation on Sign Panels

608-2.01 General: the last paragraph of the Standard Specifications is hereby deleted.

608-2.04 Overhead Sign Panels: the title and text of the Standard Specifications are revised to read:

608-2.04 Blank

608-2.05 Overlaid Sign Panels: the title and text of the Standard Specifications are revised to read:

608-2.05 Blank

608-2.06 Flat Sheet Aluminum Sign Panels With Demountable Characters: the title and text of the Standard Specifications are revised to read:

608-2.06 Blank

608-2.08 Overlaid Plywood Sign Panels With Direct-Applied or Silk-Screened Characters: the title and text of the Standard Specifications are revised to read:

608-2.08 Blank

608-2.13 Retroreflective Sheeting: the title and text of the Standard Specifications are revised to read:

608-2.13 Retroreflective Sheeting, Inks and Opaque Film:

Retroreflective sheeting, sign-making inks, and opaque films shall conform to the requirements of Section 1007.

Signs shall be fabricated in accordance with the recommendations established by the manufacturer of the sign sheeting. All processes and materials used to make a sign shall in no way impact the performance, uniform appearance (day and night), or durability of the sheeting, or invalidate the sign sheeting manufacturers' warranty.

608-2.14 Demountable Characters: of the Standard Specifications is revised to read:

(A) General:

Letters, numerals, symbols, route shields, borders, and other features of the sign message shall consist of cut-out, flat sheet aluminum legends, with direct-applied sign sheeting or other finishes, that are mounted to the sign panel with rivets as described herein. All characters shall be placed on the signs in a straight and true fashion.

Flat sheet aluminum substrates used for characters and borders shall be either aluminum alloy 3105-H14, 3003-H14, or 5052 as specified in ASTM B 209. Characters produced from the flat sheet aluminum alloy shall sit flat on the face of the sign panel without visible gap or deformation.

The thickness for letters and numbers shall be 0.032 inches. The thickness for symbols, route shields, and borders shall be 0.063 inches.

All aluminum shall be chemically treated with a chromate acid conversion type coating, or equivalent, to form an oxidation resistant barrier film that is suitable for long term outdoor application. The coating shall prevent the occurrence of oxidation that may cause streaking or discoloration on the sign. The coating shall be applied in accordance with the manufacturer's specifications, and shall have a minimum thickness of 0.002 inches.

All corners and edges of the characters shall be clean and well-defined with no apparent waviness, tears, delamination, deformation or flaws. Burrs and waste material generated from the cutting process shall be removed so characters have a clean, flat, and correct appearance.

Design of letters and numbers shall be in accordance with the project plans.

Splicing of aluminum panels will be acceptable for diagrammatic arrows or other large symbols and shields exceeding 48 inches in more than one direction. Splices, when required, shall include a continuous four- to six-inch wide aluminum back plate that overlaps

the joint. The back plate shall ensure no gap at the splice joint when the symbol is assembled and attached to the sign.

Borders on signs with demountable characters shall also be made of aluminum substrate panels, unless otherwise specified. However, in all cases borders on signs with demountable characters shall be made of the same material as the legend.

(B) Sheeting and Colors:

Sheeting or film applied to demountable characters shall be a continuous monolithic piece, without splice or patch, that covers the entire front face of the character. Splicing of the sheeting for demountable borders or characters which have a dimension larger than 48 inches in more than one direction will be allowed. Only one splice shall be allowed every four feet. When a splice is necessary, the adjoining edges shall be placed so there is no visible gap between the two pieces.

The adhesive system for sheeting and opaque films shall form a durable bond which tightly adheres to the aluminum or sign background. After attachment, the sheeting and opaque films shall not discolor, crack, craze, blister, bubble or delaminate. Sheeting and film adhesives must be warranted by the manufacturer against such defects as specified in Section 1007. Only those sheeting and film products which provide the specified warranty will be acceptable.

The color for demountable letters, numbers, symbols, and route shields on green, blue, and brown background signs shall be white, and shall conform to the requirements of Section 1007. Demountable legends on white and yellow background signs shall be black, and shall be opaque and non-reflective. Acceptable finishes for black characters shall be porcelain-enameled black, powder-coated black, or laminated black opaque acrylic film.

When borders are used with demountable characters, white legend and border shall be used on green, blue, or brown sign backgrounds, and black legend and border shall be used on white or yellow sign backgrounds. Sign sheeting conforming to Section 1007 shall be used for white borders. Black borders shall be porcelain-enameled black, powder-coated black, or laminated black opaque acrylic film.

Black porcelain enameling, black powder-coatings, or laminated black opaque acrylic film to be used for characters or borders, as specified above, shall be applied in accordance with the coating manufacturer's recommendations. The contractor shall provide copies of any warranties provided by the manufacturer for such coatings to the Engineer.

On combination signs, such as a green background sign with white characters that also includes a smaller panel with yellow background and black characters, the color scheme used for the characters and border for each portion of the sign shall be as specified above, i.e. white legend and border shall be used on the green background portion of the sign and black legend and border shall be used on the yellow background portion.

(C) Attachment of Characters and Borders:

Self plugging aluminum, protruding, regular head blind rivets shall be used to secure all demountable characters. The rivets shall conform to the applicable requirements of International Fasteners Institute (IFI) 114 standard for break mandrel blind rivets. All rivets shall be 5/32 inch in diameter with the appropriate grip range.

Rivets shall be either IFI 114 Grade 10 or 11 aluminum alloy rivets. The rivets shall have an ultimate shear and tensile strength that has been determined by IFI 135 Specification 2.1 and 2.2. The ultimate shear and tensile strength shall meet or exceed those values specified for a 5/32 inch (0.1562) nominal rivet diameter per IFI 114 Table 6 for Grades 10 or 11. A higher strength and grade aluminum rivet can be used at the option of the sign fabricator.

Rivets securing the characters to the back panel shall be of sufficient length to ensure a secure attachment and conform to the grip length specifications of the rivet manufacturer. The determination of rivet grip length shall include the total thickness of the joint. This thickness shall include the character (sheeting and aluminum sheet), spacer (if applicable) and the sign back panel (sheeting and aluminum extrusion).

The hole size used to install the rivets shall conform to the recommendation of the rivet manufacturer and Table 2 of IFI 114. Rivets shall be placed a minimum of four times the diameter of the rivet from the edge of the character being attached, e.g., 5/8 inch clearance for a 5/32 inch diameter rivet. Clearance shall be measured to the outside of the rivet head.

Minimum requirements for attaching demountable characters shall be as follows:

Straight numerals and letters such as "1" shall have three rivets, one at the top, middle and bottom. The more complex numerals and letters shall have from four to seven rivets. Letters such as "W" and "M" typically require seven rivets. Letters and numerals such as "P", "H" and "9" typically require six rivets. Letters and numerals such as "G", "S", "2", "3" and "7" typically require five rivets. A rivet shall secure each corner of the letter or numeral. For shields and symbols, rivets shall be spaced evenly around the entire perimeter. Additional rivets shall be added in the middle of the shield or symbol as necessary to eliminate bowing. Rivets for borders shall be spaced evenly around the border.

The actual number of rivets used will depend on the thickness, configuration, weight, position (with or without spacers), size of the character being attached, and the recommendations of the rivet manufacturer. The number and location of rivets shall be sufficient to secure the character to the panel so it shall not miss-align, bend or move when subjected to wind loading. Additionally, the number of rivets used shall ensure that the character does not bow or pull away from the back panel for the life of the sign. Rivets shall be placed in a defined, evenly spaced pattern which is consistent from character to character. The placement and pattern of rivets shall not interfere with the appearance of the sign from normal drive-by viewing distances. The contractor shall supply standard punch details prior to fabrication.

The protruding head and shaft of the rivets shall closely match the color of the character on which they are being applied, e.g., black characters shall be applied with black rivets. Aluminum colored rivets are acceptable for mounting white characters.

The coating used to color the rivets shall be a factory-applied anodized type finish, or equivalent, that is suitable for long term outdoor application. The coating shall have durable colorfastness and shall be capable of preventing the occurrence of oxidation that may cause streaking or discoloration on the sign. Non-factory painting of the protruding heads of the rivets is not acceptable.

608-3.01 Fabrication: the first sentence of the third paragraph of the Standard Specifications is revised to read:

Fabricated signs shall be stored indoors and kept dry during storage.

608-3.02 Installation of Sign Panels: of the Standard Specifications is modified to add:

The contractor shall provide two copies of a detailed list of all new signs installed on the project to the Engineer. The list shall include the sign identification code, the date each sign was installed (month and year), the fabricator of the sign, and the materials used to make the sign (manufacturer, type of sheeting, ink and film). The list shall be provided in a commonly used electronic spreadsheet format, such as EXCEL, and the two copies shall be submitted on either CD-ROM disks or IBM-formatted 3.5-inch floppy diskettes. Signs shall be listed in numerical order by route, direction, and milepost and, where more than one sign is installed at the same general location, a letter subscript.

Signs shall be placed at the same orientation along the roadway so that the entire legend of the signs appear uniform under normal viewing conditions, both day and night.

Upon the installation of each finished sign, the contractor shall place information on the back of the sign showing the sign identification code, the sign fabricator, the manufacturer of the sheeting used, and the month and year of the installation. The formatting of the required information shall be as shown on the plans. The information shall be positioned to be readily visible from a vantage point outside the flow of traffic and not obstructed by sign posts, extrusions, stringers or brackets. All letters shall be made of a long life material such as a black opaque acrylic film. Signs not marked as required will not be eligible for payment.

Construction signs are exempt from the installation information requirement unless noted otherwise on the project plans.

Bolts shall be tightened from the back of the sign by holding the bolt head stationary on the face of the panel to prevent damage to the sheeting surface.